

estimate of the whole cost of its publication should be furnished to the Committee.

Mr. J. Sergeant Price from the Committee on the Michaux legacy, reported that the Michaux lectures would be delivered as usual at the Horticultural Hall, in Fairmount Park, beginning to-morrow, and presented the following synopsis of the prepared course :

Free lectures in Fairmount Park on Botany and Sylviculture, on Saturdays, at 4 o'clock. Prof. J. T. Rothrock will deliver his usual course of lectures on Botany and Sylviculture, in Horticultural Hall, on the following Saturdays, at 4 P. M.

April 18. Our domestic foes, Bacteria.

25. Our domestic foes, Bacteria.

May 2. Evolution in plants.

9. Fate in forests.

16. New facts in botany.

23. Forests in civilization.

30. Plant freaks.

Sept. 12. Famous trees.

19. Unwelcome plants.

26. Statistics of forestry.

Oct. 3. Forest Laws.

10. Peculiar Woods.

17. Our park.

24. Food adulterations.

The rough minutes were read, and the Society was adjourned by the President.

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*On Composite Photography. By W. Curtis Taylor.*

*(Read before the American Philosophical Society, April 17, 1885.)*

Composite Photography is the combination of the images of a number of allied objects in such a manner as to produce one photographic impression embodying the effects of all. There are several ways of accomplishing this, but the one to be described to-night is perhaps the simplest and surest.

By this process the common characteristics of every group of related

forms may be represented with an accuracy difficult to attain by any other means. The experiments in this department of photography were originated by Francis Galton, F.R.S., to illustrate pathological inquiry; and they have excited great interest, especially among biologists, wherever they have been introduced. Dr. Billings of the Army Museum at Washington is doing excellent work, by this means, in photographing types of crania. Prof. Pumpelly of Newport, R. I., is experimenting with living heads. Our townsman, Mr. W. R. Furness, in connection with a certain historical research, was the first in this city, I believe, to apply this process. Besides these named I know of no others in our country working up this problem.

By the method brought before you to-night, the objects to be combined are first photographed to one size and the unmounted prints are fitted one over another—eyes to eyes and mouth to mouth. In order to make this adjustment accurately, a light open frame, perforated at each corner with a small hole, is made to fit on a block having corresponding pins on its corners. The frame bears cross threads agreeing with the lines of the eyes and mouth of the picture and with the average distances apart of the eyes. This frame, apart from the block, is placed on the first print, and the threads being brought into correspondence with the features named, punctures are made in the print, through the holes in the frame, and the print is then slid upon the pins in the block. All the prints are adjusted to their place on the block in this way. They are then successively exposed before the camera for such a proportion of time, each, as the number of prints may indicate. For example, if sixty seconds were required for an ordinary exposure, twelve prints would receive five seconds each. The sensitized plate in the camera is thus acted on by a number of images producing one compound image in which the separate characteristics of all have equal representation.

The first composition you are invited to examine is one made from photographs—mainly taken by ourselves last summer—of all the present officers, seventeen in number, of the American Association for the Advancement of Science. In this one head there is an exactly equal representation of the following named:

Profs. Lesley, Cope, Newton, Hilgard, Putnam, Jas. Hall, Langley, Morse, Eaton, N. H. Winchell, Wormley, Gray, Thurston, Jno. Trowbridge, Newcomb, Springer and Eddy.

These notables, all laying their heads together, are supposed to present to our gaze the typical scientific man.

It would extend our interest could we have a sufficient number of specialists to make fair averages in the principal departments of science. Whether these averages would reveal the nice points of difference that would be demanded is a question experience must decide. We shall be happy to press the inquiry.

Next is a series of three composites from seventeen original and contemporaneous likenesses of Washington, five are three-quarter views, seven are profiles and five are intermediate views of the face. To Mr. Wm. S. Baker, who has furnished an opportunity to make these photographs with a special view to this meeting, we are indebted for the use of these highly valuable portraits, many of which are extremely rare, and would have been otherwise unobtainable.

The last combination is a plunge from Elysium to Hades. Twelve of the criminal class borrowed from the Rogues' Gallery, are melted into one. There is here one murderer. The remainder are culprits of ordinary grade, mainly burglars. One is evidently half-witted. It makes only a fair representation to throw in *one* fool.

In considering the *results* of these experiments, I think you will agree that—compared with their respective constituents—the intellectual man is not so intellectual, nor is the villain so villainous. Mr. Galton intimates that this process is a beautifying one. I fear that, just to this extent, one line of its scientific value will be impaired; for, this being the case, we can look for its usefulness only as applied to the most pronounced characteristics.

But if the scientific importance of this process must indeed be limited in one direction, may we not gather from it a useful demonstration of another kind? Does not its rounding and "beautifying" effect,—if you will call it so,—illustrate the idea that the impairment of individuality is the impairment of force? The dream of a "thoroughly balanced man," a "perfectly rounded character," etc., what would its realization be? Would it be more than a man great in nothing at all? Our scientist, as we see here, is just a "nice looking" man; but is not all force rounded out of him? The same may be said for our representative from the lower walks of life. All bad men do not look bad the same way, and the overlapping of characteristics tends to destroy characteristics. To borrow from the vagaries of phrenology, fill up between the bumps and there would be no bumps left.

In the case of the Washington heads we are met by no such difficulty. These are the efforts of a number of contemporaneous artists to present each his own conception of one particular subject, and the historical value of this method of averaging results is beyond computation. It is to portraiture what the sifting of the testimonies of a multitude of eye-witnesses is to the discovery of one set of facts.

Despite the immaturity which must attach to experiments only begun, I trust you may find this presentation of the subject sufficiently suggestive to arouse your own valuable consideration.